

WHAT IS CLAIMED IS:

1. A storage system comprising:
  - a disk controller for performing control so as to transfer data sent from a host device;
  - a plurality of disk drives for storing data sent from said disk controller; and
  - a switch connected with said disk controller and said plurality of disk drives, for selecting a disk drive from said plurality of disk drives, and causing data sent from said disk controller to be transferred to said selected disk drive;wherein said switch comprises:
  - a protocol controller for controlling protocol,
  - a detector for detecting the ID number of the transfer destination disk drive for the data sent from said disk controller,
  - an ID number allocator for allocating ID numbers to said plurality of disk drives and reporting said allocated ID numbers, and
  - a controller for storing the ID numbers reported from said ID number allocator, and for performing control so as to transfer data sent from said disk controller to said transfer destination disk drive having the ID number detected by said detector.
2. The storage device according to Claim 1, wherein said switch dynamically switches between said disk controller and said disk drives.
3. The storage device according to Claim 1, wherein said switch is connected with said disk controller and said disk drives.

4. The storage device according to Claim 3, wherein said switch dynamically switches between said disk controller and said disk drives.

5. The storage device according to Claim 3, wherein said switch is a fabric switch.

6. The storage device according to Claim 1, wherein the action of sending data, sent through said disk controller, to a first disk drive is executed at the same time as the action of sending data, sent through said disk controller, to a second disk drive.

7. The storage device according to Claim 6, wherein said switch dynamically switches between said disk controller and said disk drives.

8. The storage device according to Claim 6, wherein said switch is a fabric switch.

9. The storage device according to Claim 1, wherein said switch also causes access from said disk drive controller to connect with a second disk drive, when access from said disk controller is caused to connect with a first disk drive.

10. The storage device according to Claim 9, wherein said switch dynamically switches between said disk controller and said disk drives.

11. The storage device according to Claim 9, wherein said switch is a fabric switch.

12. The storage device according to Claim 1, wherein said switch causes access from said disk controller to a first disk drive and access from said disk controller to a second disk drive to be operated in a mutually independent manner.

13. The storage device according to Claim 12, wherein said switch dynamically switches between said disk controller and said disk drives.

14. The storage device according to Claim 12, wherein said switch is a fabric switch.

15. The storage device according to Claim 1, wherein said switch receives from a first disk drive a signal showing that said first disk drive has entered a readable/writable state, and transfers data sent through said disk controller to said first disk drive which has entered a readable/writable state.

16. The storage device according to Claim 15, wherein said switch receives from a second disk drive a signal showing that said second disk drive has entered a readable/writable state, and transfers data, sent through said disk controller, to said second disk drive which has entered a readable/writable state.

17. The storage device according to Claim 16, wherein said switch dynamically switches between said disk controller and said disk drives.

18. The storage device according to Claim 16, wherein said switch is a fabric switch.

19. The storage device according to Claim 1, wherein a plurality of said disk controllers is provided, and  
wherein said switch is connected with said disk controllers.

20. The storage device according to Claim 19, wherein said switch dynamically switches between said disk controllers and said disk drives.

21. The storage device according to Claim 19, wherein said switch establishes connections between said disk controllers and said disk drives.

22. The storage device according to Claim 19, wherein said switch is a fabric switch.

23. The storage device according to Claim 1, wherein said switch is a fabric switch.

24. The storage device according to Claim 23, wherein said switch dynamically switches between said disk controller and said disk drives.

25. The storage device according to Claim 1, wherein said disk drives connected with said switch forms an Arbitrated Loop, and

wherein said switch connects with said Arbitrated Loop.

26. The storage device according to Claim 25, wherein said switch dynamically switches between said disk controller and said disk drives.

27. The storage device according to Claim 25, wherein said Arbitrated Loop comprises:

a switch connector connecting with said switch;

a disk drive connector for connecting with said disk drives,

wherein said disk drive connector is provided for each of said disk drives; and

a loop bypass circuit, provided for each of said disk drives, for permitting removal or addition of disk drives in response to signals output from said disk drives.

28. The storage device according to Claim 25, wherein said switch is a fabric switch.

29. The storage device according to Claim 1, wherein said disk drives connected to said switch constitutes a plurality of Arbitrated Loops, and

wherein said switch connects with said Arbitrated Loops.

30. The storage device according to Claim 1, wherein said switch dynamically switches between said disk controller and said disk drives.

31. The storage device according to Claim 29, wherein each Arbitrated Loop comprises:

a switch connector connecting with said switch;  
a disk drive connector for connecting with said disk drives,  
wherein said disk drive connector is provided for each of said disk drives; and  
a loop bypass circuit, provided for each of said disk drives, for permitting  
removal or addition of disk drives in response to signals output from said disk drives.

32. The storage device according to Claim 29, wherein said switch is a  
fabric switch.

33. The storage device according to Claim 1, wherein a plurality of said  
switches is provided, and  
wherein each of said switches is connected with a plurality of disk drives.

34. The storage device according to Claim 33, wherein each of said  
switches dynamically switches between said disk controller and said disk drives.

35. The storage device according to Claim 33, wherein each of said  
switches is a fabric switch.

36. The storage device according to Claim 33, wherein said disk drives  
connected to said switches constitute a plurality of Arbitrated Loops, and  
wherein said switches connect said Arbitrated Loops.

37. The storage device according to Claim 36, wherein each of said  
switches dynamically switches between said disk controller and said disk drives.

38. The storage device according to Claim 37, wherein each of said Arbitrated Loop comprises:

- a switch connector connecting with said switches;
- a disk drive connector for connecting with said disk drives,
- wherein said disk drive connector is provided for each of said disk drives; and
- a loop bypass circuit, provided for each of said disk drives, for permitting removal or addition of disk drives in response to signals output from said disk drives.

39. The disk subsystem according to Claim 36, wherein each of said Arbitrated Loops can be connected to the same number of disk drives.

40. The storage device according to Claim 36, wherein each of said switches is a fabric switch.

41. The storage device according to Claim 33, wherein said disk drives connected with each of said switches forms a plurality of Arbitrated Loops, and wherein each of said switches is connected with said Arbitrated Loops.

42. The storage device according to Claim 41, wherein each of said switches dynamically switches between said disk controller and said disk drives.

43. The storage device according to Claim 41, wherein each of said Arbitrated Loops comprises:

- a switch connector connecting with said switches;

a disk drive connector for connecting with said plurality of disk drives,  
wherein said disk drive connector is provided for each of said disk drives; and  
a loop bypass circuit, provided for each of said disk drives, for permitting  
removal or addition of disk drives in response to signals output from said disk drives.

44. The disk subsystem according to Claim 41, wherein each of said  
Arbitrated Loops can be connected to the same number of disk drives.

45. The storage device according to Claim 41, wherein each of said  
switches is a fabric switch.

46. A storage device comprising:  
a disk controller which comprises:  
a host interface controller for controlling the input/output of data from/to host  
devices,  
cache memory for temporarily storing data received by said host interface  
controller, and  
a plurality of disk drive interface controllers for transferring data received by  
said host interface controller;  
a plurality of disk drives for storing data sent from said disk controller; and  
a switch for connecting said disk controller and said plurality of disk drives,  
selecting a disk drive from said plurality of disk drives, and transferring data sent  
from said disk controller to said selected destination disk drive;  
wherein said switch comprises:  
a detector for detecting the ID number of the transfer destination disk drive for



the data sent from said disk controller,

an ID number allocator for allocating ID numbers to said plurality of disk drives and reporting said allocated ID numbers, and

a controller for transferring data sent from said disk controller to said transfer destination disk drive based on the ID number reported from said ID number allocator and the ID number detected by said detector.

47. The storage device according to Claim 46, wherein said switch dynamically switches between said disk drive interface controllers and said disk drives.

48. The storage device according to Claim 46, wherein said switch is connected with said disk drive interface controllers and said disk drives.

49. The storage device according to Claim 48, wherein said switch dynamically switches between said disk drive interface controllers and said disk drives.

50. The storage device according to Claim 48, wherein said switch is a fabric switch.

51. The storage device according to Claim 46, wherein the action of sending data, sent through said first disk drive interface controller, to said first disk drive is executed at the same time as the action of sending data, sent through said second disk drive interface controller, to said second disk drive.

52. The storage device according to Claim 51, wherein said switch dynamically switches between said disk drive interface controllers and said disk drives.

53. The storage device according to Claim 51, wherein said switch is a fabric switch.

54. The storage device according to Claim 46, wherein said switch also causes access from said second disk drive interface controller to connect with said second disk drive, when access from said first disk drive interface controller is caused to connect with said first disk drive.

55. The storage device according to Claim 54, wherein said switch dynamically switches between said disk drive interface controllers and said disk drives.

56. The storage device according to Claim 54, wherein said switch is a fabric switch.

57. The storage device according to Claim 46, wherein said switch causes access from said first disk drive interface controller to said first disk drive and access from said second disk drive interface controller to said second disk drive to be operated in a mutually independent manner.

58. The storage device according to Claim 57, wherein said switch dynamically switches between said disk drive interface controllers and said disk drives.

59. The storage device according to Claim 57, wherein said switch is a fabric switch.

60. The storage device according to Claim 46, wherein said switch receives from said first disk drive a signal showing that said first disk drive has entered a readable/writable state, and transfers data sent through said first disk drive interface controller to said first disk drive which has entered a readable/writable state.

61. The storage device according to Claim 60, wherein said switch receives from said second disk drive a signal showing that said second disk drive has entered a readable/writable state, and transfers data, sent through said second disk drive interface controller, to said second disk drive which has entered a readable/writable state.

62. The storage device according to Claim 61, wherein said switch dynamically switches between said disk drive interface controllers and said disk drives.

63. The storage device according to Claim 61, wherein said switch is a

fabric switch.

64. The storage device according to Claim 46, wherein a plurality of said disk controllers is provided, and

wherein said switch is connected with disk drive interface controllers of each of said disk controllers.

65. The storage device according to Claim 64, wherein said switch dynamically switches between said disk drive interface controllers and said disk drives.

66. The storage device according to Claim 64, wherein said switch establishes connections between said disk drive interface controllers and said disk drives.

67. The storage device according to Claim 64, wherein said switch is a fabric switch.

68. The storage device according to Claim 46, wherein said switch is a fabric switch.

69. The storage device according to Claim 68, wherein said switch dynamically switches between said disk drive interface controllers and said disk drives.

70. The storage device according to Claim 46, wherein said disk drives connected with said switch forms an Arbitrated Loop, and wherein said switch connects with said Arbitrated Loop.

71. The storage device according to Claim 70, wherein said switch dynamically switches between said disk drive interface controllers and said disk drives.

72. The storage device according to Claim 70, wherein said Arbitrated Loop comprises:  
a switch connector connecting with said switch;  
a disk drive connector for connecting with said disk drives,  
wherein said disk drive connector is provided for each of said disk drives; and  
a loop bypass circuit, provided for each of said disk drives, for permitting removal or addition of disk drives in response to signals output from said disk drives.

73. The storage device according to Claim 70, wherein said switch is a fabric switch.

74. The storage device according to Claim 46, wherein said disk drives connected to said switch constitutes a plurality of Arbitrated Loops, and wherein said switch connects with said Arbitrated Loops.

75. The storage device according to Claim 46, wherein said switch

dynamically switches between said disk drive interface controllers and said disk drives.

76. The storage device according to Claim 74, wherein each Arbitrated Loop comprises:

- a switch connector connecting with said switch;
- a disk drive connector for connecting with said disk drives, wherein said disk drive connector is provided for each of said disk drives; and
- a loop bypass circuit, provided for each of said disk drives, for permitting removal or addition of disk drives in response to signals output from said disk drives.

77. The storage device according to Claim 74, wherein said switch is a fabric switch.

78. The storage device according to Claim 46, wherein a plurality of said switches is provided, and wherein each of said switches is connected with a plurality of disk drives.

79. The storage device according to Claim 78, wherein each of said switches dynamically switches between said disk drive interface controllers and said disk drives.

80. The storage device according to Claim 78, wherein each of said switches is a fabric switch.

81. The storage device according to Claim 78, wherein said disk drives connected to said switches constitute a plurality of Arbitrated Loops, and wherein said switches connect said Arbitrated Loops.

82. The storage device according to Claim 81, wherein each of said switches dynamically switches between said disk drive interface controllers and said disk drives.

83. The storage device according to Claim 81, wherein each of said Arbitrated Loop comprises:  
a switch connector connecting with said switches;  
a disk drive connector for connecting with said disk drives,  
wherein said disk drive connector is provided for each of said disk drives; and  
a loop bypass circuit, provided for each of said disk drives, for permitting removal or addition of disk drives in response to signals output from said disk drives.

84. The disk subsystem according to Claim 81, wherein each of said Arbitrated Loops can be connected to the same number of disk drives.

85. The storage device according to Claim 81, wherein each of said switches is a fabric switch.

86. The storage device according to Claim 78, wherein said disk drives connected with each of said switches forms a plurality of Arbitrated Loops, and wherein each of said switches is connected with said Arbitrated Loops.

87. The storage device according to Claim 86, wherein each of said switches dynamically switches between said disk drive interface controllers and said disk drives.

88. The storage device according to Claim 86, wherein each of said Arbitrated Loops comprises:

- a switch connector connecting with said switches;
- a disk drive connector for connecting with said plurality of disk drives, wherein said disk drive connector is provided for each of said disk drives; and
- a loop bypass circuit, provided for each of said disk drives, for permitting removal or addition of disk drives in response to signals output from said disk drives.

89. The disk subsystem according to Claim 86, wherein each of said Arbitrated Loops can be connected to the same number of disk drives.

90. The storage device according to Claim 86, wherein each of said switches is a fabric switch.